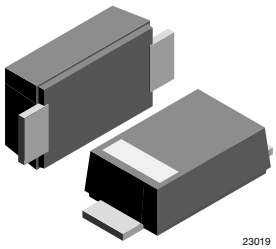
Zener Diodes with Surge Current Specification

eSMP® Series



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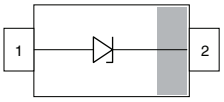


23018

SMF (DO-219AB)

FEATURES

- Sillicon planar Zener diodes
- Low profile surface-mount package
- Zener and surge current specification
- Low leakage current
- Excellent stability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Meets JESD 201 class 2 whisker test
- ESD capability according to AEC-Q101:
  human body model: > 8 kV
  machine model: > 800 V
- Wave and reflow solderable
- AEC-Q101 qualified available
- Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
- Base P/N-HM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified (available on request)
- Compatible to SOD-123W package case outline or SOD-123F and SOD-123FL
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

LINKS TO ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS		
PARAMETER	VALUE	UNIT
V_Z range nom.	3.6 to 200	V
Test current I_{ZT}	5 to 100	mA
V_{BR}	7 to 188	V
V_{WM}	6.2 to 160	V
P_{PPM}	150	W
T_J max.	175	°C
V_Z specification	Pulse current	
Circuit configuration	Single	
Polarity	Uni-directional	

ORDERING INFORMATION			
DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL	MINIMUM ORDER QUANTITY
BZD27C-M Series	BZD27C3V6P-M3-08 to BZD27C200P-M3-08	3000 per 7" reel (8mm tape)	MOQ = 30K
	BZD27C3V6P-M3-18 to BZD27C200P-M3-18	10 000 per 13" reel (8 mm tape)	MOQ = 50K

PACKAGE					
PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	WHISKER TEST ACC. JESD 201	SOLDERING CONDITIONS
SMF (DO-219AB)	15 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Class 2	Peak temperature max. 260 °C

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Power dissipation	T_L = 105 °C	P_{tot}	2300	mW
	T_A = 30 °C (1)	P_{tot}	800	mW
Non repetitive peak surge power dissipation (2)	100 µs square pulse	P_{ZSM}	300	W
	10/1000 µs waveform	P_{RSM}	150	W
Junction to lead		R_{thJL}	30	K/W
Junction to ambient air	Mounted on epoxy-glass PCB with 3 mm x 3 mm Cu pads (≥ 40 µm thick)	R_{thJA}	180	K/W
Junction temperature		T_j	175	°C
Storage temperature range		T_{stg}	-65 to +175	°C
Operating temperature range		T_{op}	-65 to +175	°C

Notes

(1) Mounted on epoxy-glass PCB with 3 mm x 3 mm Cu pads (≥ 40 µm thick)

(2) T_J = 25 °C prior to surge

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE (1)			TEST CURRENT	REVERSE CURRENT		DYNAMIC RESISTANCE		TEMPERATURE COEFFICIENT	
		V_Z at I_{ZT1}			I_{ZT1}	I_R at V_R		Z_Z at I_{ZT1}		α_{VZ} at I_{ZT1}	
		V			mA	µA	V	Ω		%/°C	
		MIN.	NOM.	MAX.		MAX.		TYP.	MAX.	MIN.	MAX.
BZD27C3V6P-M	N0	3.4	3.6	3.8	100	100	1	4	8	-0.14	-0.04
BZD27C3V9P-M	N1	3.7	3.9	4.1	100	50	1	4	8	-0.14	-0.04
BZD27C4V3P-M	N2	4	4.3	4.6	100	25	1	4	7	-0.12	-0.02
BZD27C4V7P-M	N3	4.4	4.7	5	100	10	1	3	7	-0.1	0
BZD27C5V1P-M	N4	4.8	5.1	5.4	100	5	1	3	6	-0.08	0.02
BZD27C5V6P-M	N5	5.2	5.6	6	100	10	2	2	4	-0.04	0.04
BZD27C6V2P-M	N6	5.8	6.2	6.6	100	5	2	2	3	-0.01	0.06
BZD27C6V8P-M	N7	6.4	6.8	7.2	100	10	3	1	3	0	0.07
BZD27C7V5P-M	N8	7	7.5	7.9	100	50	3	1	2	0	0.07
BZD27C8V2P-M	N9	7.7	8.2	8.7	100	10	3	1	2	0.03	0.08
BZD27C9V1P-M	O0	8.5	9.1	9.6	50	10	5	2	4	0.03	0.08
BZD27C10P-M	O1	9.4	10	10.6	50	7	7.5	2	4	0.05	0.09
BZD27C11P-M	O2	10.4	11	11.6	50	4	8.2	4	7	0.05	0.1
BZD27C12P-M	O3	11.4	12	12.7	50	3	9.1	4	7	0.05	0.1
BZD27C13P-M	O4	12.4	13	14.1	50	2	10	5	10	0.05	0.1
BZD27C15P-M	O5	13.8	15	15.6	50	1	11	5	10	0.05	0.1
BZD27C16P-M	O6	15.3	16	17.1	25	1	12	6	15	0.06	0.11
BZD27C18P-M	O7	16.8	18	19.1	25	1	13	6	15	0.06	0.11
BZD27C20P-M	O8	18.8	20	21.2	25	1	15	6	15	0.06	0.11
BZD27C22P-M	O9	20.8	22	23.3	25	1	16	6	15	0.06	0.11
BZD27C24P-M	P0	22.8	24	25.6	25	1	18	7	15	0.06	0.11
BZD27C27P-M	P1	25.1	27	28.9	25	1	20	7	15	0.06	0.11
BZD27C30P-M	P2	28	30	32	25	1	22	8	15	0.06	0.11
BZD27C33P-M	P3	31	33	35	25	1	24	8	15	0.06	0.11
BZD27C36P-M	P4	34	36	38	10	1	27	21	40	0.06	0.11
BZD27C39P-M	P5	37	39	41	10	1	30	21	40	0.06	0.11
BZD27C43P-M	P6	40	43	46	10	1	33	24	45	0.07	0.12
BZD27C47P-M	P7	44	47	50	10	1	36	24	45	0.07	0.12
BZD27C51P-M	P8	48	51	54	10	1	39	25	60	0.07	0.12
BZD27C56P-M	P9	52	56	60	10	1	43	25	60	0.07	0.12
BZD27C62P-M	Q0	58	62	66	10	1	47	25	80	0.08	0.13
BZD27C68P-M	Q1	64	68	72	10	1	51	25	80	0.08	0.13
BZD27C75P-M	Q2	70	75	79	10	1	56	30	100	0.08	0.13
BZD27C82P-M	Q3	77	82	87	10	1	62	30	100	0.08	0.13
BZD27C91P-M	Q4	85	91	96	5	1	68	60	200	0.08	0.13
BZD27C100P-M	Q5	94	100	106	5	1	75	60	200	0.09	0.13
BZD27C110P-M	Q6	104	110	116	5	1	82	80	250	0.09	0.13
BZD27C120P-M	Q7	114	120	127	5	1	91	80	250	0.09	0.13
BZD27C130P-M	Q8	124	130	141	5	1	100	110	300	0.09	0.13
BZD27C150P-M	Q9	138	150	156	5	1	110	130	300	0.09	0.13
BZD27C160P-M	R0	153	160	171	5	1	120	150	350	0.09	0.13
BZD27C180P-M	R1	168	180	191	5	1	130	180	400	0.09	0.13
BZD27C200P-M	R2	188	200	212	5	1	150	200	500	0.09	0.13

Notes

- Electrical characteristics when used as regulator diodes
- Maximum V_F = 1.2 V, at I_F = 0.2 A

(1) Pulse test: $t_p \leq 5$ ms

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT	REVERSE CURRENT		CLAMPING VOLTAGE		TEMPERATURE COEFFICIENT	
		V_Z at I_{ZT1}			I_{ZT1}	I_R at V_R		V_C at I_{RSM} (1)		α_{VZ} at I_{ZT1}	
		V			mA	µA	V	V	A	%/C	
		MIN.	NOM.	MAX.		MAX.		MAX.		MIN.	MAX.
BZD27C7V5P-M	N8	7	7.5	7.9	100	1500	6.2	11.3	13.3	0	0.07
BZD27C8V2P-M	N9	7.7	8.2	8.7	100	1200	6.8	12.3	12.2	0.03	0.08
BZD27C9V1P-M	O0	8.5	9.1	9.6	50	100	7.5	13.3	11.3	0.03	0.08
BZD27C10P-M	O1	9.4	10	10.6	50	20	8.2	14.8	10.1	0.05	0.09
BZD27C11P-M	O2	10.4	11	11.6	50	5	9.1	15.7	9.6	0.05	0.1
BZD27C12P-M	O3	11.4	12	12.7	50	5	10	17	8.8	0.05	0.1
BZD27C13P-M	O4	12.4	13	14.1	50	5	11	18.9	7.9	0.05	0.1
BZD27C15P-M	O5	13.8	15	15.6	50	5	12	20.9	7.2	0.05	0.1
BZD27C16P-M	O6	15.3	16	17.1	25	5	13	22.9	6.6	0.06	0.11
BZD27C18P-M	O7	16.8	18	19.1	25	5	15	25.6	5.9	0.06	0.11
BZD27C20P-M	O8	18.8	20	21.2	25	5	16	28.4	5.3	0.06	0.11
BZD27C22P-M	O9	20.8	22	23.3	25	5	18	31	4.8	0.06	0.11
BZD27C24P-M	P0	22.8	24	25.6	25	5	20	33.8	4.4	0.06	0.11
BZD27C27P-M	P1	25.1	27	28.9	25	5	22	38.1	3.9	0.06	0.11
BZD27C30P-M	P2	28	30	32	25	5	24	42.2	3.6	0.06	0.11
BZD27C33P-M	P3	31	33	35	25	5	27	46.2	3.2	0.06	0.11
BZD27C36P-M	P4	34	36	38	10	5	30	50.1	3	0.06	0.11
BZD27C39P-M	P5	37	39	41	10	5	33	54.1	2.8	0.06	0.11
BZD27C43P-M	P6	40	43	46	10	5	36	60.7	2.5	0.07	0.12
BZD27C47P-M	P7	44	47	50	10	5	39	65.5	2.3	0.07	0.12
BZD27C51P-M	P8	48	51	54	10	5	43	70.8	2.1	0.07	0.12
BZD27C56P-M	P9	52	56	60	10	5	47	78.6	1.9	0.07	0.12
BZD27C62P-M	Q0	58	62	66	10	5	51	86.5	1.7	0.08	0.13
BZD27C68P-M	Q1	64	68	72	10	5	56	94.4	1.6	0.08	0.13
BZD27C75P-M	Q2	70	75	79	10	5	62	103.5	1.5	0.08	0.13
BZD27C82P-M	Q3	77	82	87	10	5	68	114	1.3	0.08	0.13
BZD27C91P-M	Q4	85	91	96	5	5	75	126	1.2	0.09	0.13
BZD27C100P-M	Q5	94	100	106	5	5	82	139	1.1	0.09	0.13
BZD27C110P-M	Q6	104	110	116	5	5	91	150	1	0.09	0.13
BZD27C120P-M	Q7	114	120	127	5	5	100	167	0.9	0.09	0.13
BZD27C130P-M	Q8	124	130	141	5	5	110	185	0.81	0.09	0.13
BZD27C150P-M	Q9	138	150	156	5	5	120	205	0.73	0.09	0.13
BZD27C160P-M	R0	153	160	171	5	5	130	224	0.67	0.09	0.13
BZD27C180P-M	R1	168	180	191	5	5	150	252	0.6	0.09	0.13
BZD27C200P-M	R2	188	200	212	5	5	160	278	0.54	0.09	0.13

Notes

- Electrical characteristics when used as protection diodes

(1) Non-repetitive peak reverse current in accordance with "IEC 60-1, section 8" (10/1000 µs pulse); see fig. 4

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

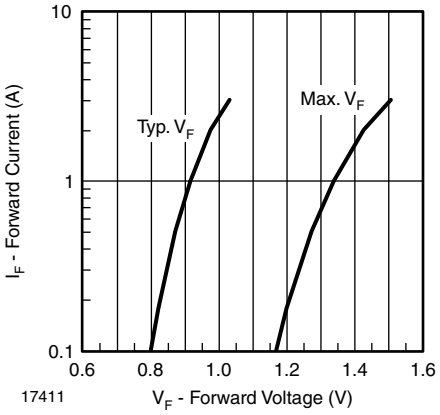


Fig. 1 - Forward Current vs. Forward Voltage

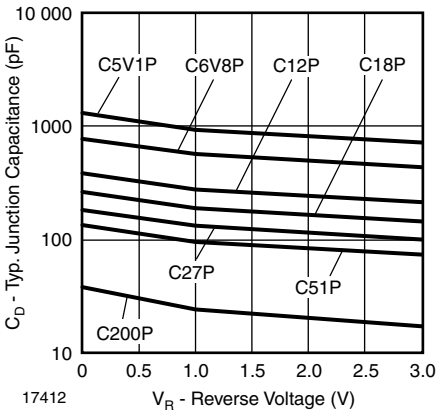


Fig. 2 - Typ. Diode Capacitance vs. Reverse Voltage

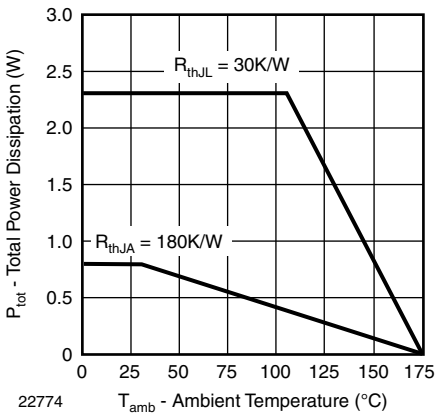


Fig. 3 - Power Dissipation vs. Ambient Temperature

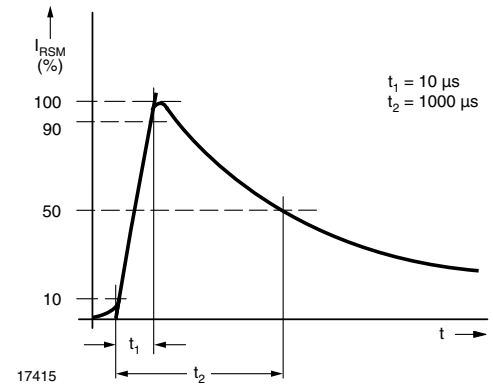


Fig. 4 - Non-Repetitive Peak Reverse Current Pulse Definition

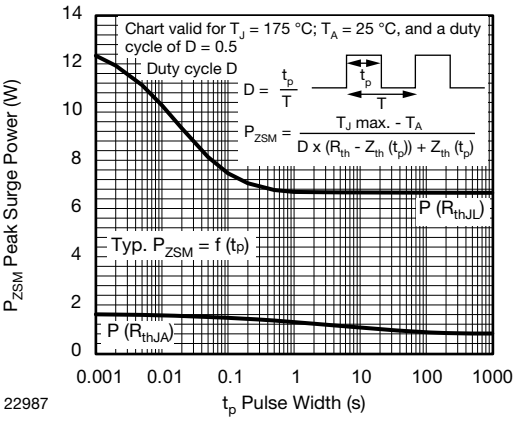


Fig. 5 - Typical Repetitive Peak Surge Power

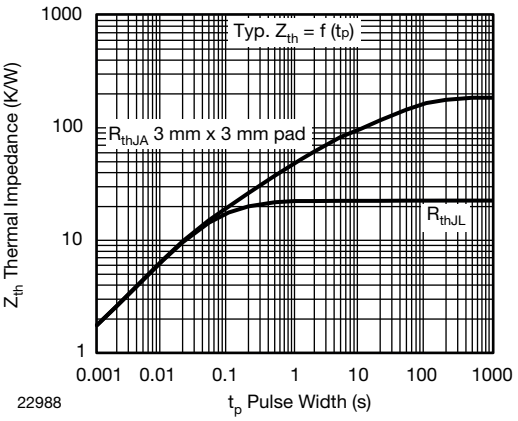
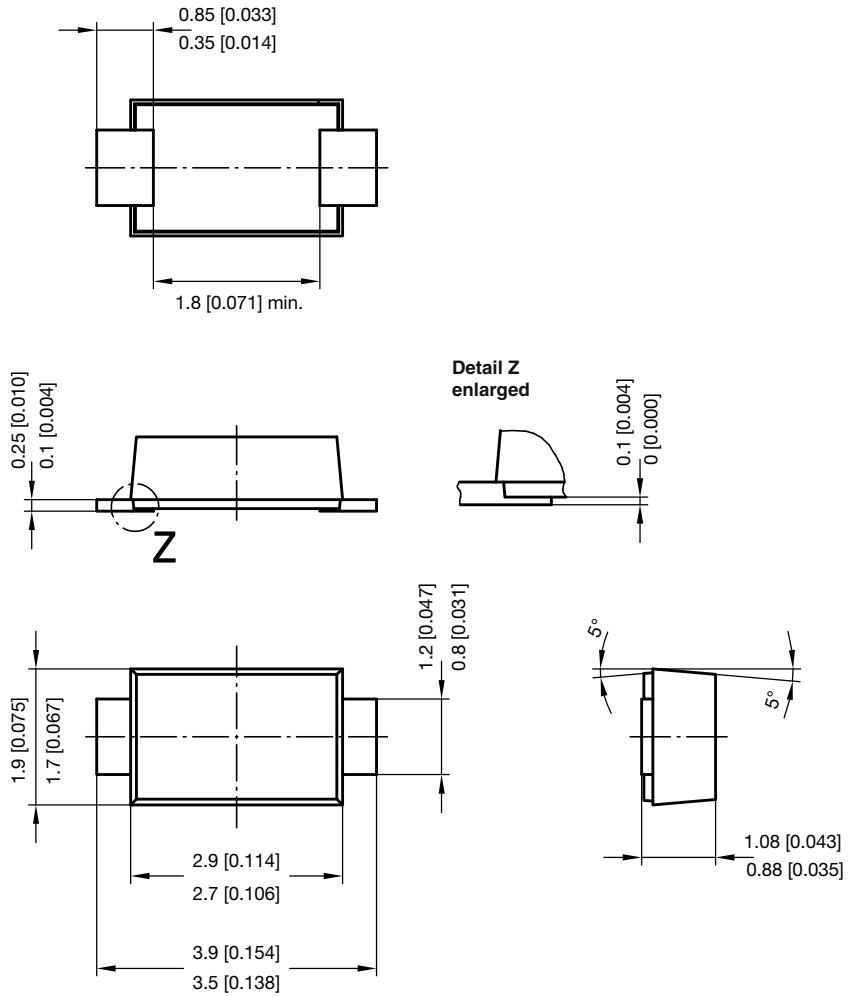


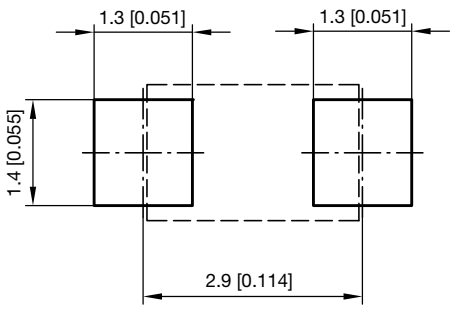
Fig. 6 - Typical Thermal Impedance vs. Time

PACKAGE DIMENSIONS in millimeters (inches): **SMF (DO-219AB)**



foot print recommendation:

Reflow soldering



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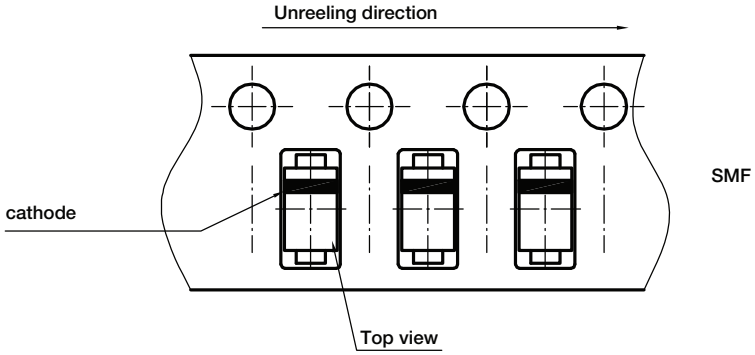
ORIENTATION IN CARRIER TAPE - SMF (DO-219AB)



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